

WHAT IS CLAIMED IS:

1. An insulated gate semiconductor device comprising:
a first gate oxide film formed on a semiconductor substrate of a first conductivity type;

5 a second gate insulating film adjacent to the first gate oxide film and thicker than the first gate oxide film;

a gate electrode comprising a first silicon layer formed on the first gate oxide film and a second gate silicon layer superimposed on the first silicon layer and partially extending over the second gate oxide film; and

10 source and drain layers of a second conductivity type formed away from the gate electrode.

2. The insulated gate semiconductor device of claim 1, wherein the source and drain layers of the second conductivity type are formed away from an edge of the second silicon layer.

15 3. The insulated gate semiconductor device of claim 1, wherein the first silicon layer is a pad polysilicon layer.

4. The insulated gate semiconductor device of claim 1, wherein the source and drain layers of the second conductivity type are formed within low concentration source and drain layers of the second conductivity type.

20 5. The insulated gate semiconductor device of claim 1, 2, 3 or 4, wherein the first and second silicon layers comprise polysilicon or amorphous silicon.

25 6. A manufacturing method of an insulated gate semiconductor device comprising:

forming a first gate oxide film on a semiconductor substrate of a first conductivity type;

30 forming a first silicon layer and an oxidation protection film on top of the first silicon layer on a predetermined area of the first gate oxide film;

forming a field oxidation film and a second gate oxide film through selective oxidation by using the oxidation protection film as a mask;

forming a second silicon layer covering an entire area of a device

intermediate after removing the oxidation protection film;

forming a gate electrode comprising the first silicon layer remaining on the first gate oxide film and the second silicon layer superimposed on the first silicon layer and partially extending over the second gate oxide film;

and forming a source and drain layers of a second conductivity type away from the gate electrode.

7. A manufacturing method of an insulated gate semiconductor device comprising:

forming low impurity concentration source and drain layers of a second conductivity type on a semiconductor substrate of a second conductivity type;

forming a first gate oxide film on the semiconductor substrate;

forming a first silicon layer and an oxidation protection film on top of the first silicon layer on a predetermined area of the first gate oxide film;

forming a field oxidation film and a second gate oxide film through selective oxidation by using the oxidation protection film as a mask;

forming a second silicon layer covering an entire area of a device intermediate after removing the oxidation protection film,

forming a gate electrode comprising the first silicon layer remaining on the first gate oxide film and the second silicon layer superimposed on the first silicon layer and partially extending over the second gate oxide film; and

forming high impurity concentration source and drain layers of the second conductivity type away from the gate electrode.

8. The manufacturing method of the insulated gate semiconductor device of claim 6 or 7, wherein the first and second silicon layers comprise polysilicon or amorphous silicon.

9. The manufacturing method of the insulated gate semiconductor device of claim 6 or 7, wherein the oxidation protection film comprises silicon nitride .